

been so practically fruitful (*Ber. naturforsch. Gesell. zu Freiburg i. Br.*, Bd. xv., 1907, pp. 38-74). His precipitates of aragonite globules or needles from various solutions pass for the most part into calcite, with characteristic rhombohedral forms, in periods varying from twenty-four hours to three months. A few, from dilute hot solutions, remain unaltered, at any rate for the period of observation, which in one case is as long as four months. Experiments to determine the composition of the coloured deposits produced by the action of calcium carbonate on salts of cobalt showed (p. 57) that calcite assumes a violet colour *when in the form of an impalpable powder* and treated in a distinctly dilute solution of cobalt nitrate. Ordinary fragments remain uncoloured, or become blue on continued boiling in a concentrated solution, while aragonite under all conditions becomes, as is now well known, violet. Though the violet colour arises in powdered calcite more slowly than in aragonite, this new discovery serves as a warning to be regarded in the application of Meigen's test. The author determines (p. 74) the violet precipitate on aragonite from a concentrated solution of cobalt nitrate as $2\text{CoCO}_3 + 3\text{Co}(\text{OH})_2 + \text{H}_2\text{O}$, and the blue one on calcite as $\text{CoCO}_3 + 3\text{Co}(\text{OH})_2$.

Prof. R. B. Young, in describing the calcareous rocks of Griqualand West (*Trans. Geol. Soc. of S. Africa*, vol. ix., 1906, p. 59), shows how oolitic dolomites have been converted into granular quartzites, and supports the late Mr. Rutley's views as to the origin of certain "metasomatic quartzites." Mr. G. Abbott illustrates many of the well-known forms of concretion in the Durham dolomite in a general paper on concretions (*Trans. South-Eastern Union of Sci. Societies*, 1907).

Messrs. T. M. Reade and Philip Holland continue their researches on our much-neglected sedimentary rocks with the analysis and discussion of a series collected near Ludlow. A full analysis of the Titterstone Cleve dolerite is also given (*Proc. Liverpool Geol. Soc.*, 1907).

Lastly, Mr. R. A. Daly's paper on the limeless ocean of pre-Cambrian time (*Amer. Journ. Sci.*, vol. xxiii., 1907, p. 93) raises many important questions as to the mode of origin of pre-Cambrian sedimentary rocks. The author holds that the land-areas of Eozoic times were of insufficient extent to supply enough lime to the ocean for the demands of shell-forming organisms. The continuous decay of abundant soft-bodied animals precipitated, moreover, as calcium carbonate what little lime entered the seas; the magnesian limestones so frequently found in pre-Cambrian sediments were also deposited as inorganic rocks by the prolonged action of the ammonium carbonate after the lime salts had been dealt with. It was only when, in Cambrian times, land-areas became more pronounced that shell-forming animals could become common; hence the rather abrupt transition from beds almost devoid of fossils to those with an abundant fauna. All this gives the reader food for meditation, and brings the petrographer, as is fitting, into the field of evolutionary geology.

G. A. J. C.

THE INSTITUTION OF MINING ENGINEERS.

THE forty-eighth general meeting of the Institution of Mining Engineers was held on June 4 and 5 in London in the rooms of the Geological Society. Mr. C. E. Rhodes read his presidential address, in which he stated that steps were being taken to transfer the headquarters of the institution to London. The main portion of his address was devoted to a consideration of some of the problems with which the rising generation of mining engineers will have to deal, namely, the sinking of deep shafts through water-bearing strata, the depth to which tubing can be put in, improved methods of splitting the air which will be required at great depths for cooling down the working places, and the method of dealing with dust, which in all probability will be abundant in deep mines.

The first paper read described the mineral resources of Trinidad. The author, Mr. John Cadman, gave a brief account of the gold ore, iron ore, graphitic schist, limestone, and coal known to exist, and dwelt more fully upon the bituminous minerals, which are of great economic importance. In a mine of the bitumen known as manjak

an explosion occurred in 1904, causing the death of seventeen miners. A sample of gas examined by the author contained 14.00 per cent. of oxygen, 11.10 per cent. of carburetted hydrogen, 1.60 per cent. of hydrogen, and 73.30 per cent. of nitrogen. It is suggested that the deficiency in oxygen is due to the absorptive properties of the manjak. During the meeting several other papers of scientific interest were read. Mr. J. B. Tyrrell described the recently discovered mineral veins of cobalt in Ontario. Mr. Greville Jones gave an account of the various types of calcining kilns for iron ore. Mr. C. B. Wedd and Mr. G. C. Drabble described the occurrence of fluor-spar in Derbyshire. The longest paper read was by Mr. S. L. Thacker, on winding-engine tests. He recorded the results of his own experience, pointed out some sources of loss, and suggested the lines on which winding-engine tests should be carried out.

In connection with the meeting, excursions were arranged on June 4 to a diving demonstration at Lambeth under the supervision of Dr. J. S. Haldane, on June 5 to the mining and metallurgical section of the Franco-British Exhibition under the guidance of Mr. Bennett H. Brough, and on June 6 to the South Metropolitan Gas Company's tar works. A new self-contained diving apparatus suitable for work in mines was exhibited for the first time. The supply of oxygen is automatic, and is furnished to the diver mixed with 60 per cent. of air. At the Franco-British Exhibition Sir Hugh Bell received the visitors in the Machinery Hall, and gave an account of the collective pig-iron exhibit and the other objects of interest in the iron and steel section. The French mining section, in which the scientific aspects of working are well shown, was much appreciated.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—On Monday, June 8, Mr. William Bateson, F.R.S., was elected to the chair of biology, which has been established for five years largely owing to the generosity of an anonymous benefactor. Mr. Bateson, who was born in 1861, is a son of the late Rev. W. H. Bateson, D.D., Master of St. John's College, and has been a fellow at the same foundation since 1885. He was educated at Rugby School, and held the Balfour studentship from 1887 to 1890; for many years he has been one of the leading workers in England on heredity and variation, and has published several important treatises on these subjects. In 1904 he received the Darwin medal of the Royal Society.

Mr. A. R. Hinks has been re-appointed chief assistant of the observatory for a period of five years from June 24, and Mr. W. E. Hartley has been re-appointed an assistant of the observatory for a period of five years from July 13.

Prof. Thomson gives notice that the new building of the Cavendish Laboratory will be opened by the Chancellor on Tuesday, June 16, at 4 p.m. In consequence of the limited accommodation, admission will be by ticket only.

In the forty-second annual report the museums and lecture-rooms syndicate records a gift of 500*l.*, made by Mr. Frank Smart, for the purchase of additional furniture and fittings in the museum of botany. The library in the department of physiology has been materially increased by many books formerly in the possession of Sir Michael Foster; the library of the medical school has also received many additions, including a large number of pamphlets and books presented by Sir T. Clifford Allbutt, K.C.B. The Woodwardian professor records several important additions to the museum, especially a fine series of slates, marbles, and rocks of economic value, which have been presented by Mrs. J. F. Walker, of York. The syndics' accounts for the year show a balance in favour of the maintenance fund of 330*l.* 4*s.* 4*d.*

The prize of 50*l.* out of the Gordon-Wigan fund for a research in chemistry has been awarded to Mr. L. A. Levy for his research entitled "Investigations on the Fluorescence of Platinocyanides."

Notice is given that a prize of 50*l.* out of the Gordon-Wigan fund will be awarded at the end of the Easter term, 1909, for a research in chemistry, of sufficient merit,

carried out in the University. The research may be in any branch of chemistry. The dissertation, with the details of the research, must be sent to the professor of chemistry not later than the division of the Easter term, 1909.

LIVERPOOL.—At the graduation ceremony on July 11 the honorary degree of LL.D. will be conferred upon Sir John Brunner, Principal Macalister, and Prof. Vinogradoff; of D.Sc. upon Mr. Francis Darwin and Prof. J. L. Todd; and of D.Eng. upon the Hon. C. A. Parsons.

MANCHESTER.—On the occasion of the installation of Viscount Morley of Blackburn as Chancellor of the University, on July 9, the honorary degree of Litt.D. will be conferred upon Mr. A. J. Evans, F.R.S., of D.Sc. upon Prof. Baldwin Spencer, F.R.S., and Prof. A. Gamgee, F.R.S., and of M.A. upon Mr. William Burton, for his scientific investigations and art productions in pottery. H.M. Treasury has allowed the grant of 12,000*l.* to remain at that figure for another year instead of reducing it to 10,000*l.* It is hoped that the grant will be continued on the higher basis, and possibly increased.

OXFORD.—Dr. B. P. Grenfell has been appointed extraordinary professor of papyrology.

The Rolleston memorial prize for 1908 has been awarded to Mr. C. C. Dobell, Trinity College, Cambridge; Mr. W. K. Spencer and Mr. C. H. G. Martin, B.A., both of Magdalen College, Oxford, were honourably mentioned by the examiners.

The Romanes lecture for 1908 will be delivered by Canon Scott Holland in the Sheldonian Theatre on Saturday, June 13, at 5 p.m. The subject of the lecture is "Bishop Butler."

The Robert Boyle lecture was delivered by Prof. Rutherford on Friday, June 5, in Balliol College Hall, the subject of the lecture being "The Transformation of Radio-active Matter."

A **CONVERSAZIONE** will be held at the East London College (University of London) on Wednesday next, June 17. The college departments will be open from 8 to 9.30 p.m.

A **SHAW** studentship for research, the gift of Mrs. Bernard Shaw, of the value of 100*l.* a year for two years, will be awarded in July by open competition at the London School of Economics and Political Science, Clare Market, W.C. Particulars of the scholarship can be obtained from the director of the school.

THE Bill "to make further provision with respect to the University of Durham" has now been printed. It proposes to appoint a body styled the University of Durham Commissioners. These Commissioners are to hold office until the end of 1909, but their powers may be continued by the King in Council, but not beyond the end of 1911. Their powers are to make statutes regulating the constitution of the University and the powers and duties of its authorities and constituent bodies and the disposition of its property in accordance with a scheme scheduled as an appendix to the Bill. Provision is made for the affiliation to the University in the faculty of science of the Sunderland Technical College, subject to its satisfying the conditions specified by the Senate of the University. The Senate is to consist of thirty-seven persons, namely, the Chancellor, six persons nominated by the Crown, the Dean and Chapter of Durham, together with so many other persons appointed by the council of the Durham colleges as shall make six in all, six appointed by such professors, tutors, and lecturers of the Durham division of the University as are not members of the Chapter, four appointed by the College of Medicine, Newcastle, four by the council of Armstrong College, and four by the professors of Armstrong College, and six appointed by Convocation, three being past students of the Durham division and three past students of the Newcastle division. Full powers are assigned to the Senate over the property, conditions of study, examinations, and degrees of the University. The Newcastle division of the University is to consist of the University College of Medicine and Armstrong College, Newcastle, but no council is set up for this division.

THE twenty-eighth annual report of the council of the City and Guilds of London Institute, dealing with the work of 1907, has now been published. The reports of the dean of the Central Technical College, of the principal of the Finsbury Technical College, of the South London Technical Art School, and of the department of technology constitute important appendices. The total income of the institute for 1907 amounted to 46,036*l.*, as compared with 44,848*l.* in 1906. A table showing the amount of the donations and subscriptions to the funds of the institute since its foundation provides much interesting information. In 1878 the total amount of such donations and subscriptions was 12,102*l.*, while in 1907 the amount reached 22,343*l.*, a gratifying increase of more than 10,000*l.* Since its foundation the institute has received from this source the large sum of 778,365*l.*, to which the table shows there have been fifty-three contributors. The largest total benefactions received in the period mentioned are from the Goldsmiths' Company, 135,314*l.*; the Fishmongers' Company, 112,270*l.*; the Clothworkers' Company, 111,750*l.*; the Mercers' Company, 75,000*l.*; the Drapers' Company, 51,500*l.*; the Skinners' Company, 50,862*l.* Previous reports of the council have directed attention to causes which impede progress in the technical instruction of artisans, and in the report on the department of technology this year the matter is referred to again. The impediments which continue to exist are, first, the difficulty of finding competent teachers, and, secondly, the unduly large proportion of artisan students who enter technical classes without the preliminary knowledge necessary to take full advantage of the instruction they receive. We have referred on many occasions in these columns to the necessity for serious continuation-school work after the elementary school has been left if young artisans are to derive full benefit from technical courses later in life. It is quite clear that the gap between the day school and the technical institute must be bridged in some way if the money expended on technical instruction is to produce its best results.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society. March 26.—"Note on the Ascent of Meteorological Balloons and the Temperature of the Upper Air." By A. Mallock, F.R.S.

The recent investigation of the upper atmosphere by means of india-rubber balloons has led to the discovery that an almost constant temperature is reached when the pressure has decreased to about 150 mm. The lowest pressure reached in England is a little under 50 mm., and the corresponding height about 20 kilometres.

The note examines from a theoretical point of view what the behaviour of balloons such as are used in meteorological work must be as regards the possible heights to which they might ascend and the variations of their velocity as they rise. The determining factors are:—

- (1) The relative density of the gas in the balloon and of the outer air at the same pressure.
- (2) The ratio of the dead weight of the balloon and fittings to the total lifting force at ground-level.
- (3) The compression, by the elasticity of the balloon, of the gas it contains.

It is shown that the velocity of the balloon at first increases as the one-sixth power of the ratio of the density of the air at the elevation attained to the density at ground-level,¹ and that when the elastic compression is small the upward velocity reaches its maximum not far from the greatest elevation to which the balloon can attain.

The results of the equations are traced in Diagram I., the values for the ratio of dead weight to lifting force and the elastic compression being such as are likely to be met with in practice. It is remarkable how rapidly the velocity decreases as the minimum pressure is approached.

To connect the pressure with the height at which it is experienced, the temperature at every point of the ascent

¹ The reason being that the decrease in density rather more than compensates for the effect of the increased cross-section.